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Two Ships of Theseus
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Abstract

David Rose and his colleagues (2020) argue on the basis of a large cross-cultural study that the story of the Ship of Theseus is a genuine puzzle in a sense that people who consider it feel inclined to assert two prima facie inconsistent propositions ('Ambivalence'). In response, Marta Campdelacreu and her colleagues (Forthcoming) argue that the data reported by Rose *et al*. fail to support Ambivalence. Namely, the data show that there is sharp *interpersonal* disagreement among different readers of the Ship of Theseus story, but they fail to demonstrate *intrapersonal* conflict or indecision. Should *intrapersonal* Ambivalence be demonstrated, this, according to Campdelacreu *et al*., would be a good indicator of the presence of a puzzle. Here, I provide empirical evidence for *intrapersonal* Ambivalence about the story of the Ship of Theseus.

1. Introduction

It is a platitude that artifacts can be repaired by replacing their damaged parts with new ones. It is also a platitude that artifacts that are made of parts can be disassembled, stored in a disassembled form, and then later reassembled. The story of the Ship of Theseus is an ancient conundrum about persistence (Plutarch 1914, p. 49) that clashes these two platitudes. Here's how this story is presented in its modern form by Thomas Hobbes:

> For if, for example, that ship of Theseus, concerning the difference whereof made by continued reparation in taking out the old planks and putting in new, the sophisters of Athens were wont to dispute, were, after all the planks were changed, the same numerical ship it was at the beginning; and if some man had kept the old planks as they were taken out, and by putting them afterwards together in the same order, had again made a ship of them, this, without doubt, had also been the same numerical ship with that which was at the beginning; and so there would have been two ships numerically the same, which is absurd (1839: 136-7; *De Corpore*, Part II, Ch. 11, §7).

Recently, David Rose and his colleagues (2020) argued on the basis of a large cross-cultural study that the story of the Ship of Theseus is (a) a genuine puzzle in a sense that people who consider it feel inclined to assert two prima facie inconsistent propositions ('Ambivalence'), and that (b) this is true cross-culturally ('Universality'). Participants in this study were asked to read the following story modeled on the story of the Ship of Theseus:

> John is an accomplished woodworker and sailor, whose lifelong hobby is building rowboats by hand. He built his first rowboat—which he named "Drifter"—thirty

> years ago. Over the years there has been wear and tear, and every single one of the original planks in that rowboat has been replaced.
>
> John—never one to throw anything out—has stored all of the original planks in his shed over the years. Last month John—realizing that he had accumulated enough old planks for a whole rowboat—took out his old plans for Drifter and assembled these old planks exactly according to his old plans. John now has two rowboats of the same design: the rowboat that resulted from gradually replacing the original planks used to build a boat thirty years ago and that now has none of its original planks, and the rowboat just built one month ago with all and only the original planks that were used thirty years ago.
>
> John has promised two of his friends—Suzy and Andy—that they can borrow Drifter for an outing. But Suzy and Andy disagree on which of the two rowboats is actually Drifter. Andy thinks that the rowboat just built a month ago is actually Drifter since it has exactly the same planks, arranged in exactly the same way as Drifter originally had. But Suzy thinks that the rowboat that resulted from gradually replacing the original planks used to build a boat thirty years ago is actually Drifter since, even though it has all new parts, this was just the result of normal maintenance.

After reading this story, study participants were asked to indicate whether they agree with Suzy or Andy, with the following two options provided (parts in brackets not shown to the participants):

> [**Replacement**] I agree with Suzy that Drifter is the rowboat that resulted from gradually replacing the original planks used to build a boat thirty years ago and that now has none of its original planks.
> [**Original Parts**] I agree with Andy that Drifter is the rowboat built a month ago with the planks and plans that were used thirty years ago.

Participants were then asked to indicate how certain they were in their response to this question, on a 0–100% scale, with low numbers indicating uncertainty and high numbers indicating certainty.

Rose and his colleagues argued for Ambivalence and Universality on the basis of the fact that (i) in all 24 sites in which the data were collected, there was either a nearly equal split of responses (5 sites) or, where there was a majority answer, there was at least a sizable minority giving an opposite answer and (ii) people in the minority (as well as those who were in the majority) were confident in their responses.

More recently, however, Marta Campdelacreu and her colleagues (Forthcoming) argued that these data fail to support Ambivalence. Namely, they suggest that the data presented by Rose et al. show that there is sharp *interpersonal* disagreement among different readers of the story of the Ship of Theseus, but they fail to demonstrate "*intrapersonal* conflict or indecision, felt by each reader" (p. 4). Only if *intrapersonal* Ambivalence is demonstrated, this, according to Campdelacreu *et al*., would be "a good indicator" of the presence of a puzzle (p.p. 3-4, notes 3 and 4). *Interpersonal* disagreements, according to Campdelacreu *et*

al., "surely do not indicate the existence of puzzles" (p. 5), and therefore the data by Rose *et al*. only "show that people disagree about the right answer" (ibid.).

In the present paper, I provide some evidence for *intrapersonal* Ambivalence about the Ship of Theseus story. I do this by providing participants with additional response options and asking them to justify their responses.

2. Studies

2.1. Study 1. An outing

The first study is a version of the original study with additional response options.

Participants. One hundred ten study participants were recruited on *Prolific* (https://prolific.co), a popular online research subject recruitment tool. Nine participants were excluded for incorrectly answering the control question and one for an incomplete response, resulting in $N = 100$.[1] Study participants were US or UK residents who indicated that English was their first language; 70% identified as females, 30% identified as males, $M_{\text{age}} = 35.4$, $SD_{age} = 11.6$, age range 18-71.

Materials. Study participants were provided with the same vignette used by Rose *et al*. 2020 (see above).[2] However, in addition to Replacement and Original Parts (presented in a randomized order), two more response options were available (presented in fixed order after the two original response options; parts in brackets not shown to the participants):

> [**Both**] There is a sense in which Suzy is right and there is a sense in which Andy is right. There is a sense in which one rowboat is Drifter and there is a sense in which the other one is Drifter.
> [**Neither**] Both Suzy and Andy are mistaken and neither of the two rowboats is Drifter.

I will refer to this question as Additional Options. After selecting their response to the Additional Options, study participants were asked to indicate how certain they were in their response and asked to explain the response in one or two sentences.

On the next page, participants were asked: "If forced to choose, which of the two rowboats is the better candidate to being Drifter?" with the following two options (presented in randomized order):

> [**Replacement**] The rowboat that resulted from gradually replacing the original planks used to build a boat thirty years ago and that now has none of its original planks.

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[1] In both studies, participant recruitment was continued till $N = 100$ of eligible participants was reached.

[2] As in the original study, the following control question was included:

> According to the story, which of the following statements is correct?
> The boat John built one month ago is made of new planks.
> The boat John built one month ago is made of thirty-year-old planks.

[**Original Parts**] The rowboat built a month ago with the planks and plans that were used thirty years ago.

I will refer to this question as Restricted Choice. After responding to this question, participants were also asked to indicate how certain they were in their response.

Results.

Additional Options. The majority of study participants (59%) chose Both – a response option that was not available in the original study by Rose *et al*. 22% of participants chose Replacement, and 16% of participants chose Original Parts, while the remaining 3% chose Neither (see Figure 1a). A chi-square test of goodness of fit showed that responses were not equally distributed, X^2 (3, N = 100) = 69.2, $p < .001$. Binomial test indicates that participants chose Both more frequently than could be expected by chance alone ($p < .001$).

Study participants were relatively certain in their response, M = 78.6%, Mdn = 80%. One-way ANOVA showed that there was a difference in certainty ratings for different choice options, $F(3,10.2) = 3.74$, $p = .048$. This difference is driven by low mean certainty ratings in the smallest group (Neither, M = 60%), while in the other three groups, the certainty ratings were very similar (M = 77-84%).

Restricted Choice. When presented with a Restricted choice (see Figure 1b), two-thirds of participants (66%) indicated that the better candidate to being Drifter is Replacement, more than could be expected by chance, X^2 (1, N = 100) = 10.2, $p = .001$. The remaining 34% indicated that Original Parts is the better candidate.

Study participants were moderately certain in their response to Restricted Choice, M = 72.3%, Mdn = 75%. No difference in certainty ratings was observed between the choice options, $t(98) = .723$, $p = .471$. In general, participants were slightly less certain in their responses to Restricted choice question than to the Additional options question, $t(99) = 2.78$, $p = .007$, $d = .28$.

Combinations of responses. Looking at all possible combinations of answers to the two questions about the Drifter (See Figure 2a), the most common option (43%) is choosing Both initially and then choosing Replacement in the Restricted choice task. The second most common combination (20%) is choosing Replacement both times. 16% of participants chose Both initially and then opted for Original Parts, while 13% of participants chose Original Parts both times. The remaining four combinations were selected very rarely, by 0-3% of participants each.

2.2. Study 2. An exhibition.

Study 1, by showing that Both is by far the most popular response option, provides evidence for intrapersonal Ambivalence about the Ship of Theseus. To test the robustness of the results with a different vignette, I tried to manipulate the reason why the ship needs to be identified. Following Wiggins' suggestion that "if one party is looking for an archaeological relic and the other for a functionally persistent continuant," they may "find different entities

with different principles of individuation in one and the same place" (2001: 94), Study 2 describes the reason for identification not in terms of functional (as was the case in Study 1) but in terms of antiquarian interest.

Materials. Study materials were the same as in Study 1, except that the reason for borrowing was different. While in Study 1 Drifter was borrowed "for an outing," in Study 2 it was borrowed "for an exhibition in the maritime museum, where it will be shown together with the first rowboats built by other local rowboat hobbyists."

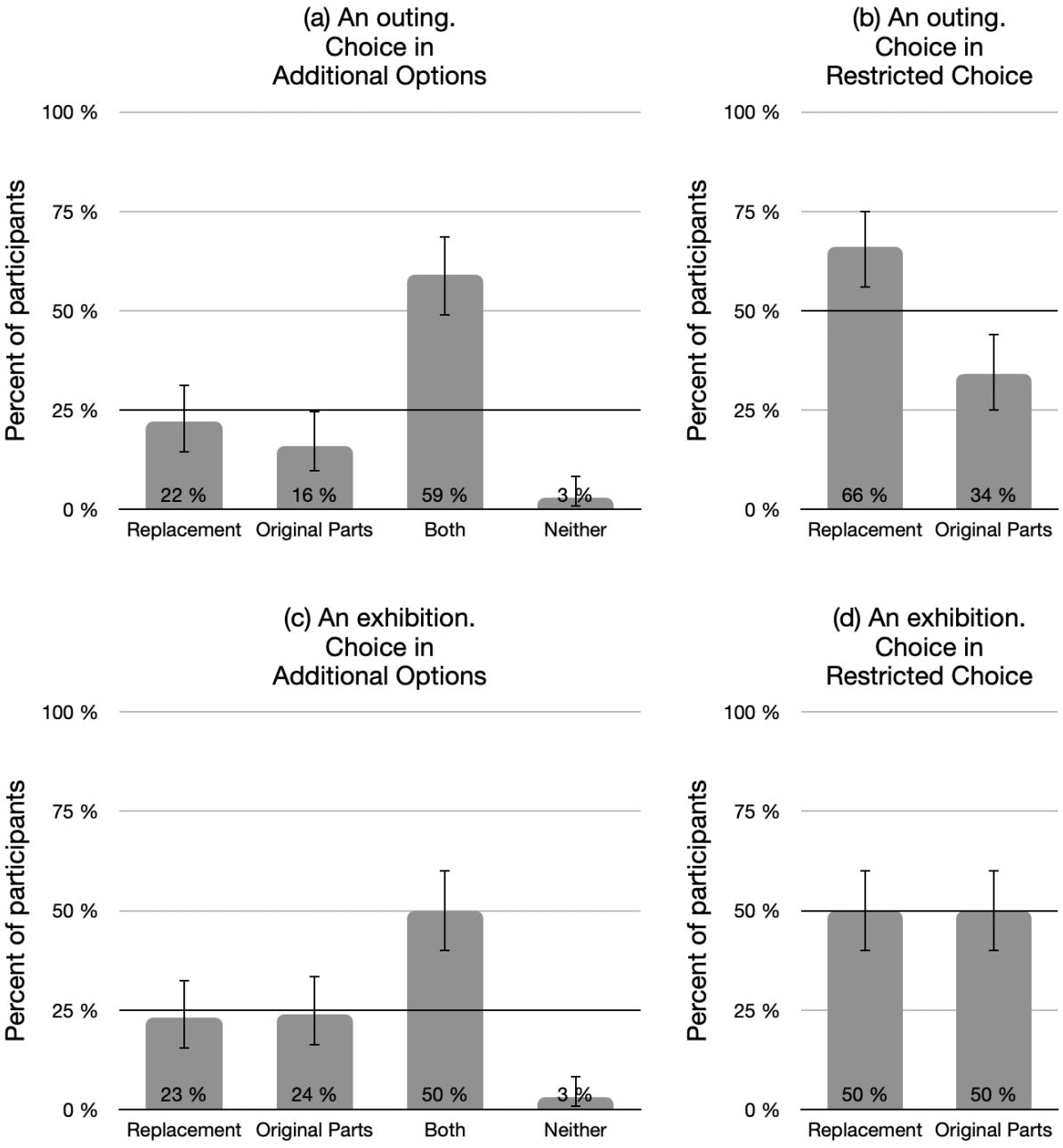

Figure 1. Distribution of responses to the Additional Options question and the Restricted Choice question in Studies 1 and 2. Reference lines indicate the proportion of responses that could be expected to obtain by chance alone (.25 for (a) and (c), and .5 for (b) and (d)). Error bars indicate 95% CI.

Participants. One hundred four study participants were recruited on *Prolific*. 4 participants were excluded for incorrectly answering the control question, resulting in $N = 100$. Study participants were US or UK residents who indicated that English was their first language; 70% identified as females, 29% identified as males, one person identified as non-binary. $M_{age} = 37.3$, $SD_{age} = 14.5$, age range 18-74.

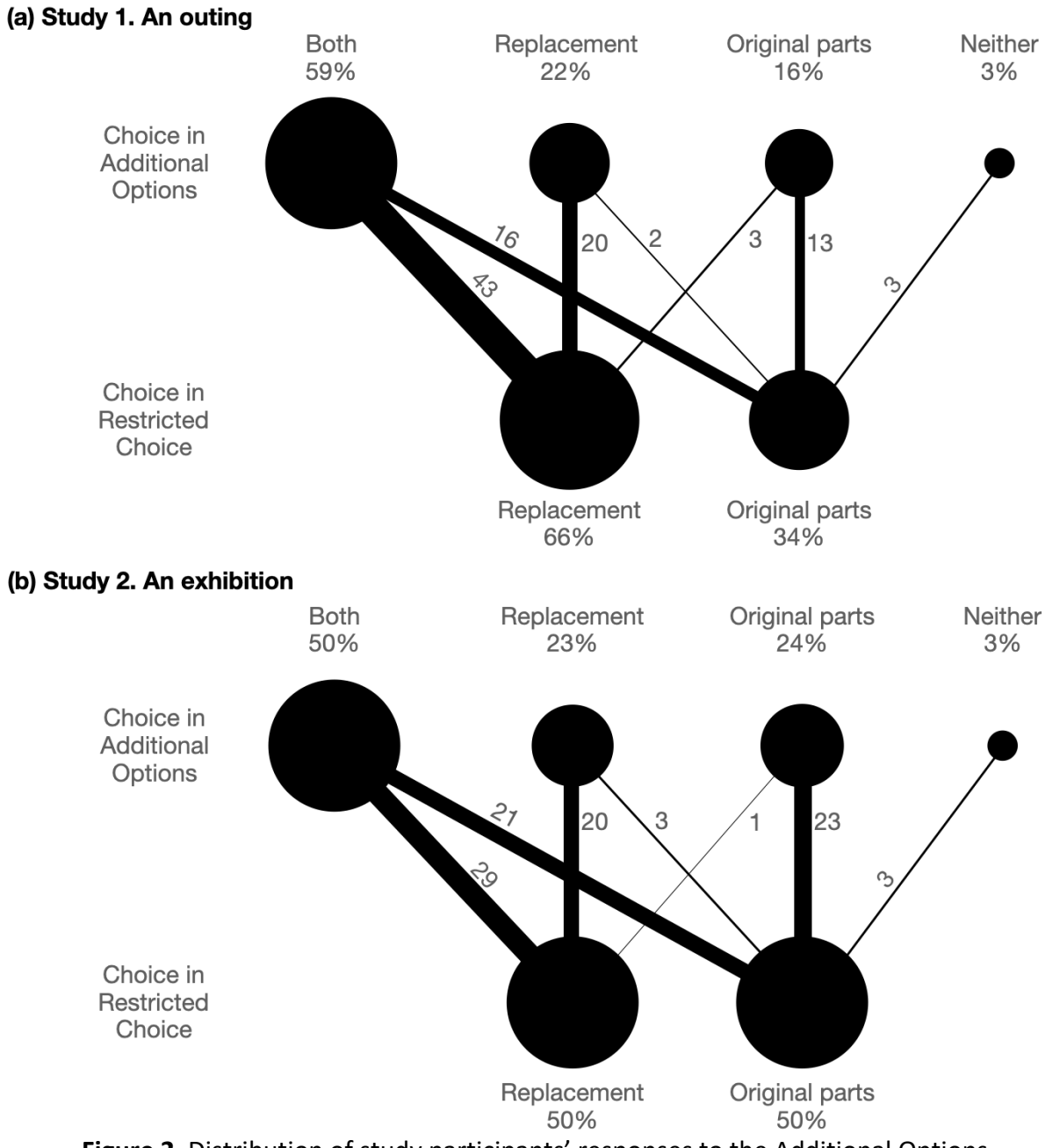

Figure 2. Distribution of study participants' responses to the Additional Options question and the Restricted Choice question and most frequent combinations of responses in Study 1 (a) and Study 2 (b). The area of a circle represents how many study participants chose a particular option. The width of the connecting lines represents how many participants provided a given combination of responses.

Results.

Additional Options. Half of the study participants (50%) chose Both. 23% of participants chose Replacement. 24% of participants chose Original Parts, while 3% chose Neither (see Figure 1c). A chi-square test of goodness of fit showed that responses were not equally distributed, X^2 (3, N = 100) = 44.6, p < .001. Binomial test indicates that participants chose Both more frequently than could be expected by chance alone (p < .001).

Study participants were relatively certain in their response, M = 77.1%, Mdn = 80%. One-way ANOVA showed that there was no difference in certainty ratings for different choice options, F(3,9.42) = 1.95, p = .189.

Restricted Choice. When presented with a Restricted Choice (see Figure 1d), each option was chosen by 50% of participants.

Study participants were moderately certain in their response, M = 71.2%, Mdn = 75%. No difference in certainty ratings was observed between participants who chose each of the two options, t(98) = 1.22, p = .225. In general, participants were less certain in their responses to Restricted choice question than to the Additional options question, t(99) = 3.20, p = .002, d = .32.

Combinations of responses. Looking at all possible combinations of answers to the two questions about the Drifter in Study 2 (See Figure 2b), the most common option (29%), again, is choosing Both initially and then choosing Replacement in the Restricted choice task. The second most common option (23%) is choosing Original Parts both times. 21% of participants chose Both initially and then opted for Original Parts, while 20% chose Replacement both times. The remaining four combinations were selected very rarely, by 0-3% of participants each.

2.3. Comparisons between the two studies:

No difference was observed between the two studies for the Additional Options question, X^2 (3, N = 200) = 2.37, p = .500.

For the Restricted Choice question, a difference was observed between the two studies, X^2 (1, N = 200) = 5.25, p = .022. Study participants were slightly more inclined to choose Original Parts in ‘An exhibition’ (50%) than in ‘An outing’ (34%).

No differences were observed between the studies in certainty ratings for either of the two questions (both ps > .55).

3. Discussion

Adding an additional option that allowed to express *intrapersonal* Ambivalence proved to be a game-changer. At least half of the participants (59% in Study 1; 50% in Study 2) chose this option which was not available in the original study by Rose *et al*., providing support to Ambivalence.

Let us look at some examples of justifications provided by the participants who chose Both:

> I completely get both sides, on the one hand, the one built from the old planks is physically drifter - everything's literally identical, and it uses the parts from it. On the other hand, the maintained one has lived the life of John's boat and could be sentimentally considered as Drifter, with all the experiences and events it has been through. I've actually been in this predicament with my bicycle(s) haha (M, 21)

> It really depends on whether the boat itself as a whole or the materials count as the boat. I remain unsure which should truly count but can totally see both points of view so remain undecided (F, 36)

> It can be argued logically that both boats are Drifter. The one built recently from the original planks has the old materials of Drifter, while the boat with replaced planks is also connected to the original Drifter over years of gradual replacement. You cannot argue that one is Drifter and the other is not (M, 51)

Explicit expressions of ambiguity and puzzlement were quite common in such justifications, including “I’m not sure really. I just feel they both are,” “It’s really difficult,” “Very tricky,” “I think there is no black and white definitive answer,” “this one fizzled my brain.”

In addition to majority responses expressing Ambivalence, there were also minority responses that do not suggest Ambivalence and opt for either one or the other principle.

Continuity of form:

> Obviously, it is the boat that has always been Drifter. Despite any changes or upgrades it will always be Drifter. (F, 34)

> The act of replacing parts does not mean a new item has been built. (M, 49)

> The original rowboat is called Drifter, even though it has changed in its entire make-up, it’s still drifter. The rowboat made a month ago is made out of Drifter- but it’s not Drifter (F, 30)

> If it had been replaced in one go, it wouldn't be Drifter, but a slow replacement kept its identity. (M, 40)

Continuity of matter:

> As it’s the same planks of wood that made the original Drifter really it is the original Drifter. (F, 37)

> I agree with Andy as the boat is exactly the same as it was when first built 30 years ago, same planks and everything. In my mind its like taking an engine apart to clean

> it, it's the same engine before being taken apart and after being put back together. (M, 24)
>
> Even though planks have been replaced, it is the original planks that make up Drifter. (M, 27)

Gradual nature of change was usually considered to be an illustration of continuity, with analogies to repair, biological growth, or surgical procedures, as in "if we replace a hip or knee or an organ... we are still the same person" (F, 29), "cells within our body change completely within 7 years... yet we are still classed as the same person." (F, 39) or "It's like owning a car and then slowly repairing it and replacing things, it's still the same car" (F, 49).

In several cases, however, gradual nature of change was taken to demonstrate the opposite:

> [The case is analogous] to pop and rock groups: personnel change over the years until not one original member is left. Therefore, a group that comprises no original members and does not have the singer who recorded the original songs, is simply a covers band. (M, 66)
>
> Because it could be argued that replacing something bit-by-bit results in it becoming something completely different, therefore both people have a case. (M, 22)

In addition to the continuity of form and the continuity of matter, one other criterion stood out – study participants sometimes referred to the continuous engagement with the drifter. Examples include: "it's experiences of the boat and the time spent on it over the years that gives its character" (M, 35), "all the hard work and love […,] memory and nostalgia" (F, 41), "history of use and wear" (F, 25). This, potentially, could be another criterion that plays an important part in folk reasoning about the identity of artifacts.

Finally, in addition to explicit references to the persistence through gradual replacements, there were also some references to persistence through disassembly and reassembly, as in

> If the boat was being sent by post and was disassembled, transported, then reassembled, it would still be the same boat. The fact that it was done gradually and the parts were used for something else in the mean time is irrelevant. (M, 21).

Hierarchy. Campdelecreu *et al*. raise a possibility that "there is a hierarchical order between the principles that govern identification and reidentification of objects" (Forthcoming: p. 7). We can look into this possibility by checking how do participants who initially indicate Ambivalence (n = 109) resolve it when asked to make Restricted choice. Overall, two thirds (66%; 73% in Study 1 and 58% in Study 2, see Figure 2) of such participants opted for Replacement, X^2 (1, N = 109) = 11.2, p < .001. While the evidence is very tentative, overall results suggest that in our sample the two principles – continuity of form and continuity of matter – are hierarchically ordered, with continuity of form being a weightier one. When study participants feel Ambivalence, they tend to resolve it by prioritizing the continuity of form.

Folk ontological pluralism. Available empirical research suggests that the folk are pretty flexible in their thinking about sameness and identity. For instance, Sarah Weaver and John Turri (2018) report several studies in which people judged that the same person existed in two different places at the same time. In the present studies, however, written justifications did not include any suggestions of this type, namely that Drifter is simultaneously in two places. Hannah Tierney, on the other hand, reports a set of studies suggesting that "ordinary thought contains two concepts of persisting persons, each responsible for a separate set of intuitions, *both of which* are canonical conceptions and need not exclude the other" (2020: 154; See also Sider 2001; Tierney et al. 2014). Current results – even though they deal with artifacts rather than persons – paint a similar picture. The most popular response was "There is a sense in which one rowboat is Drifter and there is a sense in which the other one is Drifter," and written justifications provide ample evidence that participants were quite comfortable in articulating those different senses.

Reasons for identification. While no differences were observed between the two studies in responses to the Additional Options question, in the Restricted Choice, study participants were more inclined to opt for continuity of matter when the reason for identification of rowboat was selecting museum exhibits than when it was an outing. This tentatively suggests that weight assigned to different principles of identification and reidentification is sensitive to practical considerations (see Wiggins 2001: 94).

Relation to Rose et al. 2020. While the present work goes beyond the work reported in Rose *et al*. by directly testing *intrapersonal* Ambivalence, there is a sense, however, in which the results align very closely with those reported by Rose et al. In the original study, in both the USA and the UK approximately two-thirds of participants opted for Replacement. This was also the case in the present study (Study 1, which was adapted from Rose *et al*.) with US and UK nationals when only two response options were presented in the Restricted Choice question (66% of participants chose Replacement).

Limitations. While I limited my discussion to the Ship of Theseus story as far as it concerns the persistence of artifacts, such as rowboats, the story was also taken by philosophers to provide a telling analogy for discussions on persistence of plants, animals, human beings and various other entities.[3] It remains to be seen if Ambivalence is also true of versions of the story concerned with other entities than artifacts. Furthermore, while the present studies provide some evidence that Ambivalence is true of English speakers, it remains to be seen if this result generalizes to other languages.

4. Conclusion.

Rose *et al*. (2020) argue, on the basis of a large cross-cultural study, that the classic story of the Ship of Theseus is a genuine puzzle in a sense that people who consider it feel inclined to assert two prima facie inconsistent propositions ('Ambivalence'). In response, Campdelacreu *et al*. (Forthcoming) argue that these data fail to support Ambivalence. In particular, the data show that there is sharp *interpersonal* disagreement among different

[3] Notably, a structurally similar story about demons tearing off parts of a traveler's body and replacing them with body parts of a corpse was used in a Buddhist treatise from around the fourth century CE to explore issues of selfhood and personal identity (see Huang and Ganeri 2021).

readers of the story of the Ship of Theseus, but they fail to demonstrate *intrapersonal* conflict or indecision. Should *intrapersonal* Ambivalence be demonstrated, this, according to Campdelacreu *et al*., would be a good indicator of the presence of a puzzle. Studies reported in the present paper provide direct empirical evidence for *intrapersonal* Ambivalence about the Ship of Theseus story. This gives reasons to claim that the story of the Ship of Theseus is a genuine puzzle.

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